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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

WESTERN DIVISION

TELEDYNE TECHNOLOGIES INCORPORATED, a Delaware corporation,

Plaintiff,

vs.

HONEYWELL INTERNATIONAL, INC., a Delaware corporation,

Defendant.

CASE NO. 06-06803-MMM (SHx)

FIRST AMENDED COMPLAINT FOR:

1) PATENT INFRINGEMENT;
2) BREACH OF CONTRACT;
3) MISAPPROPRIATION OF TRADE SECRETS;
4) COMMON LAW MISAPPROPRIATION;
5) INTENTIONAL INTERFERENCE WITH PROSPECTIVE ECONOMIC ADVANTAGE;
6) NEGLIGENT INTERFERENCE WITH PROSPECTIVE ECONOMIC ADVANTAGE;
7) INTENTIONAL MISREPRESENTATION; and
8) NEGLIGENT MISREPRESENTATION.

DEMAND FOR JURY TRIAL

Plaintiff Teledyne Technologies Incorporated ("Teledyne"), for its First Amended Complaint herein, alleges as follows:

NATURE OF THE CASE

1. Plaintiff Teledyne brings this action seeking injunctive relief and damages for Defendant's breach of contract, misappropriation of trade secrets, intentional and negligent interference with prospective economic advantage, and intentional and negligent misrepresentation concerning Teledyne's technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance. Teledyne also seeks relief for Defendant's unauthorized manufacture, use, sale, and offer for sale of products that infringe a Teledyne patent directed to such technology.

THE PARTIES

2. Plaintiff Teledyne is a corporation organized and existing under the laws of the State of Delaware. Teledyne's principal place of business is located at 1049 Camino Dos Rios, Thousand Oaks, California 91360.

3. Defendant Honeywell International, Inc. ("Honeywell") is a corporation organized and existing under the laws of the State of Delaware. Honeywell's principal place of business is located at 101 Columbia Road, Morris Township, New Jersey 07962.

JURISDICTION AND VENUE

4. This action arises under the patent laws of the United States, 35 U.S.C. § 271. This Court has jurisdiction over the action pursuant to 28 U.S.C. §§ 1331

and 1338(a)-(b), and pursuant to its powers of supplemental and pendent jurisdiction, 28 U.S.C. § 1367.

5. Venue is proper in this district under 28 U.S.C. §§ 1391(b)-(c) and 1400(b).

FACTUAL BACKGROUND

Teledyne's Business

6. Teledyne is a leading provider of sophisticated electronic components, instruments, and communication products, including defense electronics, data acquisition and communications equipment for airline and business aircraft, monitoring and control instruments for industrial and environmental applications and components, and subsystems for wireless and satellite communications.

7. Teledyne Controls, a business unit of Teledyne, specifically focuses on the design and manufacture of avionics and ground-related electronic systems for commercial air transport, business and regional aviation, government, and defense applications, and has been a leader in that industry for over 40 years. Its product lines include such technologies as data acquisition and management systems, data recording and transfer systems, flight safety and training solutions, aircraft information systems, and airport systems. (Teledyne Controls, as a business unit of Teledyne, is also referred to herein as "Teledyne").

8. Among the many innovations that Teledyne has developed for the aviation industry are systems that permit aircraft data, such as flight performance and maintenance characteristics, to be automatically transferred from an aircraft after the aircraft lands. Alternative methods for obtaining and transferring such data require either extensive human involvement in downloading and/or transporting the data to a site for analysis, or the installation of costly infrastructure at each airport and/or terminal gate at which the data is to be obtained. In contrast, Teledyne's

novel and elegant solution utilizes the preexisting cellular infrastructure for mobile telephones to receive wireless transmission of the data from the aircraft, and to direct that data, for example through the Internet, to any desired location in the world for analysis. Teledyne's cost-efficient method allows almost immediate access to the data for analysis, and eliminates the often-lengthy delays and uncertainty inherent in alternative methods of transferring this data.

9. These Teledyne systems also permit the wireless transfer of information and files to an aircraft over the cellular infrastructure, which can be used, for example, to update software and other files on the aircraft.

10. Teledyne markets products utilizing this wireless data transfer technology under its Wireless GroundLink® ("WGL") brand. These products have been highly successful and have been enthusiastically accepted by the airline industry.

11. For its innovation in developing its wireless data transfer technology, Teledyne was rewarded by the United States Patent and Trademark Office with United States Patent No. 6,181,990 (the "'990 patent"), entitled "Aircraft Flight Data Acquisition and Transmission System." (A true and correct copy of the '990 patent and its associated reexamination certificate are attached to this Complaint as Exhibit A.).

12. Teledyne marks and has marked the '990 patent on its WGL products.

The Confidential Disclosure Agreement

13. On information and belief, in or about November 2002, Honeywell recognized the problems inherent in other methods of obtaining and transferring aircraft data and sought a solution. In particular, Honeywell sought a cost-effective and reliable means and method for automatically transferring aircraft data from an aircraft after the aircraft lands anywhere in the world.

14. The same month, November 2002, Steve Kersh, Customer Support Program Manager for Honeywell, contacted Tamas Igloi of Teledyne. During their conversation, Mr. Kersh expressed interest to Mr. Igloi in meeting for the purpose of discussing Teledyne's wireless data transfer technology, and for devising a solution to Honeywell's data transfer needs. Mr. Kersh represented that Honeywell was interested in pursuing a business relationship with Teledyne with respect to these issues.

15. Thereafter, on or about November 22, 2002, Teledyne and Honeywell, through its Honeywell Engines, Systems & Services business unit, entered into a Confidential Disclosure Agreement ("Agreement"). The Agreement stated that Teledyne "is a manufacturer of Wireless Ground Link and possesses certain information, data, and experience relating thereto . . . which it considers to be confidential, proprietary, and a valuable commercial asset of" Teledyne. The Agreement further stated that its purpose was "to facilitate discussions between the [Parties] . . . to enable the [Parties] to technically evaluate the other's [information] for the purpose of discussing possible application of the Wireless Ground Link product to transmit engine data for processing and of furthering the business relationship between the [Parties]." (A true and correct copy of the Agreement is attached to this Complaint as Exhibit B and is incorporated herein by reference).

16. Under the Agreement, Honeywell was obligated to "not disclose [Teledyne information] to other than its officers and employees who need to receive such [information] for purposes of discussion, and who are informed of the obligations of this Agreement." Honeywell was further obligated to "not use any of the [Teledyne information] . . . except as contemplated by this Agreement."

Teledyne's Trade Secret Information

17. Following the execution of the Agreement, and in reliance on Honeywell's representations therein and by Mr. Kersh, the parties entered into discussions and exchanges concerning the application of Teledyne's WGL technology to transmit Honeywell engine data. During these discussions and exchanges, Teledyne disclosed confidential and trade secret information to Honeywell.

18. On December 13, 2002, a meeting was held among senior executives and other personnel of Honeywell and Teledyne at the offices of Honeywell Engines, Systems & Services ("HESS") in Phoenix, Arizona. The purpose of the meeting was for Teledyne to demonstrate to Honeywell how its WGL technology operated, and how it could provide a cost-efficient and reliable solution to Honeywell's data transfer needs.

19. Attending the meeting from Teledyne were Ghobad Karimi and Tamas Igloi. On information and belief, Mr. Karimi was the Director, Flight Data Services, for Teledyne Controls at that time, and Mr. Igloi was the Marketing Director, Flight Data Services. Attending the meeting from HESS were Messrs Vince Trim, Vice President - Business Aviation Propulsion; Kevin S. Dittmar, Principal Engineer - New Business, APU Projects Airframe Systems; Paul D. Schmidt, Manager - Aftermarket Maintenance Programs; Richard Horvath, TFE731 Product Line Manager - Propulsion Systems; and Steve Kersh - Customer Support Program Manager. Attending from Honeywell Aerospace Electronic Systems was Victor Vasquez, Sales Manager - Aviation Information Services. Also attending from Honeywell was Tim Belling, Controls Engineer - Business Aviation.

20. At the meeting, and in reliance on the Agreement and Honeywell's representations that it intended in good faith to pursue a business relationship with Teledyne, Teledyne disclosed to Honeywell highly confidential and trade secret

information. Specifically, Teledyne disclosed to Honeywell the particular manner and means for creating a wireless data transfer system that would meet Honeywell's specific needs. The confidential and trade secret information disclosed by Teledyne to Honeywell during the meeting (the "trade secret information"), included, without limitation:

a) technical details concerning the complete architecture of a proposed system, tailored to Honeywell's requirements, utilizing Teledyne's WGL technology;

b) the interfaces for such a system with aircraft systems and engines;

c) the environmental specifications, wiring, sensors and activation of such a system;

d) the costs associated with implementing the proposed system, including the costs associated with downloading the data;

e) information concerning the speed associated with the proposed system's operation, including the speed of downloading the data;

f) information concerning the reliability and efficiency of the proposed system's performance;

g) the implementation and certification process for the proposed system; and

h) information concerning a schedule for implementing Teledyne's proposed system, including timeframes for each implementation phase and the steps to be taken during each phase.

21. All of this information was highly confidential and proprietary to Teledyne, and provided to Honeywell in reliance on its representations that it intended in good faith to pursue a business relationship with Teledyne.

22. Subsequently, a meeting was held in January 2003, at which Mr. Igloi of Teledyne was introduced by Honeywell to a Honeywell client, NetJets, as being part of the "partnership" between Honeywell and Teledyne.

23. In the normal course, following the December 2002 and January 2003 meetings, a trial of Teledyne's proposed system would have been undertaken on an aircraft. Indeed, Honeywell's Steve Kersh had talked of such a trial. These trials usually take between six and nine months to prepare and execute. However, on February 17, 2003, only two months after Teledyne first explained the system to Honeywell, and without even a test trial on an aircraft, Honeywell sent Teledyne a Request for Quotation for an aircraft-based TFE731 ECTM Data Download System.

24. On March 28, 2003, Teledyne provided a Technical and Commercial Proposal in response to Honeywell's request. Teledyne's Proposal contained further confidential documents and information concerning its WGL technology. As with all the prior information disclosed by Teledyne to Honeywell, the Proposal was provided under the terms of the Agreement and in reliance on Honeywell's representations.

25. The trade secrets described above and that were disclosed to Honeywell in the December 2002 meeting, the March 2003 Proposal, and various other conversations, are not publicly available or ascertainable by Teledyne's competitors. In addition, Teledyne has devoted substantial efforts and expense to maintain the confidentiality and security of its trade secrets regarding its technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance.

Honeywell's Decision to Breach the Agreement, Misappropriate Teledyne's Trade Secret Information, and to Develop an Infringing System

26. On or about May 13, 2003, Honeywell notified Teledyne that Honeywell had supposedly made a decision to use "another source" for a solution to

its data acquisition and transmission problems rather than the WGL technology proposed by Teledyne.

27. On information and belief, Honeywell's notice that it intended to use "another source" was a ruse, and, in fact, Honeywell had intended all along to manufacture a solution to its data acquisition and transmission problems itself after receiving confidential and other information from Teledyne. Indeed, on information and belief, Honeywell's representations that it intended to pursue in good faith a relationship with Teledyne concerning a solution to Honeywell's data acquisition and transmission problems were false.

28. On information and belief, in or about June 2005, Honeywell began marketing and offering for sale its FliteLink Wireless Data Management system ("FliteLink"), both separately and in conjunction with its Flight Data Acquisition and Management System ("FDAMS"). The FliteLink system automatically downloads aircraft data from, for example, the FDAMS or other flight data recorders and wirelessly transmits such data for analysis from the aircraft after landing using the existing cellular infrastructure for mobile telephones.

29. On information and belief, Honeywell's manufacture, use, sale, and offer for sale of the FliteLink system, and the FliteLink system in conjunction with Honeywell's FDAMS or other such equipment, infringes claims of Teledyne's '990 patent.

30. On information and belief, in or about August 2006, Honeywell began marketing and offering for sale its Honeywell Gatelink system. The Gatelink system automatically downloads aircraft data and wirelessly transmits such data for analysis from the aircraft after landing using the existing cellular infrastructure for mobile telephones. In addition, the Gatelink system allows for the transfer of information and files, using the existing cellular infrastructure for mobile telephones, to an aircraft.

31. On information and belief, Honeywell's manufacture, use, sale, and offer for sale of the Gatelink system, and the Gatelink system in conjunction with other equipment, infringes claims of Teledyne's '990 patent.

32. On information and belief, Honeywell has developed, or is currently developing, a system referred to as its Zing Intelligent Monitoring Network ("Zing") for wirelessly obtaining Honeywell engine data from a Honeywell TFE731 Digital Electronic Engine Controller. Discovery may reveal that Honeywell's Zing system also infringes one or more claims of Teledyne's '990 patent.

33. Honeywell is not licensed or otherwise authorized to make, use, sell, or offer for sale any system or method claimed in the '990 patent, and Honeywell's conduct is, in every instance, without Teledyne's consent.

FIRST CLAIM FOR RELIEF

(Infringement of the '990 Patent - 35 U.S.C. § 271(a)-(c))

34. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 33, as though fully set forth at length.

35. Teledyne owns all right, title, and interest in and to the '990 patent, including the right to sue thereon and the right to recover for infringement thereof.

36. On information and belief, Honeywell has infringed and is infringing the '990 patent by making, using, selling, and offering to sell the inventions defined by one or more claims of this patent.

37. On information and belief, Honeywell is aiding and abetting, and actively inducing and contributing to, infringement of the '990 patent by its customers.

38. Honeywell's conduct has caused, and unless enjoined will continue to cause, irreparable injury to Teledyne for which it has no adequate remedy at law. Teledyne is therefore entitled to a preliminary and permanent injunction restraining and enjoining Honeywell, its agents, servants, and employees, and all persons acting

thereunder, in concert with, or on its behalf, from infringing the claims of the '990 patent.

39. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages, including the loss of its proprietary information and competitive position. Such damages cannot presently be ascertained with precision.

40. Upon information and belief, Honeywell's infringement has been and continues to be willful.

SECOND CLAIM FOR RELIEF

(Breach of Contract)

41. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 40, as though fully set forth at length.

42. On or about November 22, 2002, Teledyne and Honeywell entered into a Confidential Disclosure Agreement ("Agreement").

43. Implied in the Agreement is a covenant by Honeywell that it would act in good faith and deal fairly with Teledyne; that it would do nothing to interfere with Teledyne's right to receive the benefit of the Agreement including, without limitation, Teledyne's expectation that the information disclosed pursuant to the Agreement would be used solely in furtherance of a relationship between Teledyne and Honeywell; and that Honeywell would place Teledyne's interests concerning Teledyne's technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance on an equal footing with its own interests.

44. Teledyne has performed all obligations and conditions precedent under the Agreement.

45. On information and belief, Honeywell breached the Agreement, including, without limitation, the implied covenant of good faith and fair dealing, by using and disclosing confidential information provided to Honeywell by Teledyne

under and in accordance with the Agreement for purposes not permitted under the Agreement. Honeywell has failed to perform its obligations under the Agreement and committed the acts and omissions alleged hereinabove, for the conscious purpose of withholding from Teledyne the rights and benefits to which it is entitled under the Agreement.

46. Honeywell's conduct has caused, and unless enjoined will continue to cause, irreparable injury to Teledyne for which it has no adequate remedy at law. Teledyne is therefore entitled to a preliminary and permanent injunction restraining and enjoining Honeywell, its agents, servants, and employees, and all persons acting thereunder, in concert with, or on its behalf, from disclosing or using any confidential, proprietary or trade secret information regarding Teledyne's technology for the automatic acquisition and transmission of aircraft data.

47. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages, including the loss of its proprietary information and competitive position. Such damages cannot presently be ascertained with precision.

THIRD CLAIM FOR RELIEF

(Misappropriation of Trade Secrets)

48. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 47, as though fully set forth at length.

49. By reason of the foregoing acts, Honeywell has engaged in misappropriation of Teledyne's trade secrets, without Teledyne's express or implied consent, in violation of California Civil Code Sections 3426-3426.10.

50. Teledyne has developed highly valuable trade secrets regarding technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance. This information (1) is not generally known to the public, or to other persons, who could obtain economic value from its disclosure or

use; (2) derives independent economic value from not being so known, in that it has been generated over a long period of time through the expenditure of substantial money, expertise and effort; and (3) is the subject of reasonable efforts by Teledyne to maintain its secrecy.

51. Teledyne is informed and believes that Honeywell improperly acquired Teledyne's trade secrets regarding technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance. Honeywell represented to Teledyne that Honeywell intended to pursue in good faith a relationship with Teledyne to solve Honeywell's aircraft data acquisition and transmission problems and requirements. On information and belief, these representations were false, and Honeywell knew that they were false when made. On information and belief, Honeywell in actuality intended to manufacture a solution to its data acquisition and transmission problems itself after receiving confidential and other information from Teledyne.

52. On information and belief, Honeywell made these representations to Teledyne with the intent that Teledyne would rely on these representations to enter into the Confidential Disclosure Agreement with Honeywell and to induce Teledyne to disclose confidential and other information about Teledyne's wireless data acquisition and transmission technology to Honeywell.

53. Teledyne is informed and believes that Honeywell has also improperly disclosed and used Teledyne's trade secrets regarding technology for the automatic acquisition and transmission of aircraft data for analysis and maintenance. Under the terms of the Agreement, Honeywell was permitted to disclose and use Teledyne's trade secret information for the *sole purpose* of "furthering the business relationship between the [Parties]." Notwithstanding these restrictions, Honeywell disclosed and used Teledyne's trade secret information for the antithetical purpose of manufacturing a solution to its data acquisition and transmission problems itself.

54. Honeywell's conduct has caused, and unless enjoined will continue to cause, irreparable injury to Teledyne for which it has no adequate remedy at law. Teledyne is therefore entitled to a preliminary and permanent injunction restraining and enjoining Honeywell, its agents, servants, and employees, and all persons acting thereunder, in concert with, or on its behalf, from disclosing or using any confidential, proprietary or trade secret information regarding Teledyne's technology for the automatic acquisition and transmission of aircraft data, for any purpose.

55. As a result of the aforementioned conduct, Teledyne has also suffered damages and will imminently suffer further damages, including the loss of its trade secrets and competitive position. Such damages cannot presently be ascertained with precision.

56. The aforementioned conduct has been despicable, wanton, oppressive, willful, malicious, duplicitous, and performed with conscious disregard of Teledyne's rights and with the intent to deprive Teledyne of its rights. Accordingly, Teledyne is entitled to an award of punitive and exemplary damages pursuant to California Civil Code Sections 3294 and 3426.3(c), and reasonable attorneys' fees pursuant to California Civil Code Section 3426.4.

FOURTH CLAIM FOR RELIEF

(Common Law Misappropriation)

57. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 56, as though fully set forth at length.

58. By reason of the foregoing acts, Honeywell has engaged in the common law tort of misappropriation. Teledyne made a substantial investment of time, effort, and money to develop its trade secrets regarding its technology for the automatic acquisition and transmission of aircraft data. Honeywell has improperly obtained these trade secrets from Teledyne and has used them in a manner and for a purpose not authorized by Teledyne.

59. Honeywell's conduct has caused, and unless enjoined will continue to cause, irreparable injury to Teledyne for which it has no adequate remedy at law. Teledyne is therefore entitled to a preliminary and permanent injunction restraining and enjoining Honeywell, its agents, servants, and employees, and all persons acting thereunder, in concert with, or on its behalf, from disclosing or using any confidential, proprietary or trade secret information regarding Teledyne's technology for the automatic acquisition and transmission of aircraft data, for any purpose.

60. As a result of the aforementioned conduct, Teledyne has also suffered damages and will imminently suffer further damages, including the loss of its trade secrets and competitive position. Such damages cannot presently be ascertained with precision.

61. The aforementioned conduct has been despicable, wanton, oppressive, willful, malicious, duplicitous, and performed with conscious disregard of Teledyne's rights and with the intent to deprive Teledyne of its rights. Accordingly, Teledyne is entitled to an award of punitive and exemplary damages pursuant to California Civil Code Section 3294 and the common law.

FIFTH CLAIM FOR RELIEF

(Intentional Interference With Prospective Economic Advantage)

62. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 61, as though fully set forth at length.

63. On information and belief, there existed an economic relationship between Teledyne and certain airlines and/or aircraft companies (collectively, the "airlines"), whereby such airlines were willing to acquire systems incorporating Teledyne's technology for the automatic acquisition and transmission of aircraft data. These economic relationships contained the probability of future economic benefit to Teledyne.

64. On information and belief, Honeywell knew of the existence of the economic relationships between Teledyne and the airlines.

65. On information and belief, Honeywell intentionally and wrongfully interfered with Teledyne's relationship with the airlines by, *inter alia*, selling to the airlines competing systems for the automatic acquisition and transmission of aircraft data that infringe Teledyne's patent, and that were developed and manufactured using confidential and trade secret information misappropriated from Teledyne.

66. As a direct and proximate result of the aforementioned conduct, Teledyne's relationship with the airlines has been disrupted, and Teledyne has been deprived of the significant economic benefit of contracting with the airlines for the sale of its systems for the automatic acquisition and transmission of aircraft data.

67. On information and belief, one example of Honeywell's intentional and wrongful interference concerns Teledyne's relationship with DB Airlines ("DBA"). In January 2006, DBA sought tenders for the acquisition of a wireless data acquisition system. Both Teledyne and Honeywell tendered bids. On information and belief, Honeywell's bid involved the use of systems that infringe Teledyne's patent, and that were developed and manufactured using Teledyne's misappropriated trade secret information.

68. Within the last month, Teledyne was informed by DBA that it would not receive the contract. Rather, DBA informed Teledyne that it would acquire a wireless acquisition and transfer system from Honeywell. Consequently, Teledyne was intentionally and wrongfully deprived of a significant economic benefit because of an infringing system that Honeywell developed from Teledyne's own trade secret information.

69. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages. Such damages cannot presently be ascertained with precision.

70. The aforementioned conduct has been despicable, wanton, oppressive, willful, malicious, duplicitous, and performed with conscious disregard of Teledyne's rights and with the intent to deprive Teledyne of its rights. Accordingly, Teledyne is entitled to an award of punitive and exemplary damages.

SIXTH CLAIM FOR RELIEF

(Negligent Interference With Prospective Economic Advantage)

71. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 70, as though fully set forth at length.

72. On information and belief, there existed an economic relationship between Teledyne and certain airlines and/or aircraft companies (collectively, the "airlines"), whereby such airlines were willing to acquire systems incorporating Teledyne's technology. These economic relationships contained the probability of future economic benefit to Teledyne.

73. On information and belief, Honeywell knew of the existence of the economic relationships between Teledyne and the airlines.

74. On information and belief, Honeywell wrongfully interfered with Teledyne's relationship with the airlines by, *inter alia*, selling to the airlines competing systems for the automatic acquisition and transmission of aircraft data that infringe Teledyne's patent, and that were developed and manufactured using confidential and trade secret information misappropriated from Teledyne.

75. It was reasonably foreseeable that Honeywell's wrongful conduct would interfere with Teledyne's economic relationships with the airlines if Honeywell failed to exercise due care.

76. As a direct and proximate result of the aforementioned conduct, Teledyne's relationship with the airlines has been disrupted, and Teledyne has been deprived of the significant economic benefit of contracting with the airlines for the sale of its systems for the automatic acquisition and transmission of aircraft data.

77. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages. Such damages cannot presently be ascertained with precision.

SEVENTH CLAIM FOR RELIEF

(Intentional Misrepresentation - Cal. Civ. Code §§ 1709-10 and 1572)

78. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 77, as though fully set forth at length.

79. Honeywell represented to Teledyne that Honeywell intended to pursue in good faith a relationship with Teledyne to solve Honeywell's aircraft data acquisition and transmission problems and requirements.

80. On information and belief, these representations were false, and Honeywell knew that they were false when made. On information and belief, Honeywell in actuality intended to manufacture a solution to its data acquisition and transmission problems itself after receiving confidential and other information from Teledyne.

81. On information and belief, Honeywell made these representations to Teledyne with the intent that Teledyne would rely on these representations to enter into the Confidential Disclosure Agreement with Honeywell and to induce Teledyne to disclose confidential and other information about Teledyne's wireless data acquisition and transmission technology to Honeywell.

82. Teledyne was unaware of the falsity of Honeywell's representations and justifiably relied on them in entering into the Agreement and disclosing confidential and other information to Honeywell about Teledyne's wireless data acquisition and transmission technology.

83. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages, including the loss of its trade

secrets and competitive position. Such damages cannot presently be ascertained with precision.

84. The aforementioned conduct has been despicable, wanton, oppressive, willful, malicious, duplicitous, and performed with conscious disregard of Teledyne's rights and with the intent to deprive Teledyne of its rights. Accordingly, Teledyne is entitled to an award of punitive and exemplary damages.

EIGHTH CLAIM FOR RELIEF

(Negligent Misrepresentation - Cal. Civ. Code §§ 1709-10 and 1572)

85. Teledyne incorporates by reference each and every allegation contained in paragraphs 1 through 84, as though fully set forth at length.

86. Honeywell represented to Teledyne that Honeywell intended to pursue in good faith a relationship with Teledyne to solve Honeywell's aircraft data acquisition and transmission problems and requirements.

87. On information and belief, these representations were false when made and were made without any reasonable ground for believing them to be true. On information and belief, Honeywell in actuality intended to manufacture a solution to its data acquisition and transmission problems and requirements itself after receiving confidential and other information from Teledyne.

88. On information and belief, Honeywell made these representations to Teledyne with the intent that Teledyne would rely on these representations to enter into the Confidential Disclosure Agreement with Honeywell and to disclose confidential and other information about Teledyne's wireless data acquisition and transmission technology to Honeywell.

89. Teledyne was unaware of the falsity of Honeywell's representations and justifiably relied on them in entering into the Agreement, and disclosing confidential and other information to Honeywell about Teledyne's wireless data acquisition and transmission technology.

90. As a result of the aforementioned conduct, Teledyne has suffered damages and will imminently suffer further damages, including the loss of its trade secrets and competitive position. Such damages cannot presently be ascertained with precision.

PRAYER FOR RELIEF

WHEREFORE, Teledyne prays for judgment against Honeywell as follows:

A. That Honeywell has infringed and is infringing the '990 patent, and that such infringement is willful;

B. That Honeywell and its subsidiaries, affiliates, parents, successors, assigns, officers, agents, representatives, servants, and employees, and all persons in active concert or participation with them, be preliminarily and permanently enjoined from continued infringement of the '990 patent;

C. That Honeywell be ordered to pay Teledyne its damages caused by Honeywell's infringement of the '990 patent, and that such damages be trebled, together with interest thereon;

D. That this case be declared exceptional pursuant to 35 U.S.C. § 285 and that Teledyne be awarded its reasonable attorneys' fees and costs;

E. That Teledyne recover the greater of the amount of Honeywell's unjust enrichment or its actual damages and lost profits arising from Honeywell's breach of the Confidential Disclosure Agreement, misappropriation of Teledyne's trade secret information, intentional and negligent interference with Teledyne's prospective economic advantage, and intentional and negligent misrepresentation, in an amount to be proved at trial, and recover statutory damages, pursuant to California Civil Code Sections 3426-3426.10, and the common law, together with interest thereon from the dates such damages were incurred or profits lost;

F. That Honeywell, as well as its employees and agents, and all those acting in concert or participation with them, be preliminarily and permanently enjoined from disclosing or using any of Teledyne's confidential, proprietary or trade secret information regarding Teledyne's wireless data acquisition and transmission technology;

G. That Honeywell pay to Teledyne the full cost of this action and Teledyne's reasonable attorneys' fees pursuant to California Civil Code Section 3426.4;

H. That Honeywell be ordered to pay Teledyne punitive and exemplary damages pursuant to California Civil Code Section 3426.3(c) and 3294, and the common law, in a sum sufficient to punish Honeywell, and to make an example of it, and deter it from similar wrongdoing; and

I. That Teledyne have such other and further relief as the Court deems just and proper.

DATED: September 26, 2007

QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP

By Frederick Lorig per AFA w/permission
Frederick A. Lorig
Attorneys for Plaintiff Teledyne Technologies Incorporated

DEMAND FOR JURY TRIAL

Teledyne hereby demands a trial of all issues by jury.

DATED: September 26, 2007

QUINN EMANUEL URQUHART OLIVER & HEDGES, LLP

By Frederick Lorig per AFA w/permission
Frederick A. Lorig
Attorneys for Plaintiff Teledyne Technologies Incorporated

US006181990B1

(12) **United States Patent**
Grabowsky et al.

(10) **Patent No.: US 6,181,990 B1**
(45) **Date of Patent: Jan. 30, 2001**

(54) **AIRCRAFT FLIGHT DATA ACQUISITION AND TRANSMISSION SYSTEM**

(75) Inventors: **John Francis Grabowsky**, Camarillo; **David Ray Stevens**, Simi Valley, both of CA (US)

(73) Assignee: **Teledyne Technologies, Inc.**, Los Angeles, CA (US)

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/126,156**

(22) Filed: **Jul. 30, 1998**

(51) **Int. Cl.**[7] **H04B 7/00**; G06F 17/40; G06F 13/00

(52) **U.S. Cl.** **701/14**; 701/35; 455/431

(58) **Field of Search** 701/14, 3, 24, 701/35; 455/431, 422, 456

(56) **References Cited**

U.S. PATENT DOCUMENTS

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Assistant Examiner—Eric M Gibson
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(57) **ABSTRACT**

An aircraft data transmission system used with an aircraft having a data acquisition unit. The system includes a communications unit located in the aircraft and in communication with the data acquisition unit. The system also includes a cellular infrastructure in communication with the data communications unit after the aircraft has landed. The system further includes a data reception unit in communication with the cellular infrastructure.

33 Claims, 10 Drawing Sheets

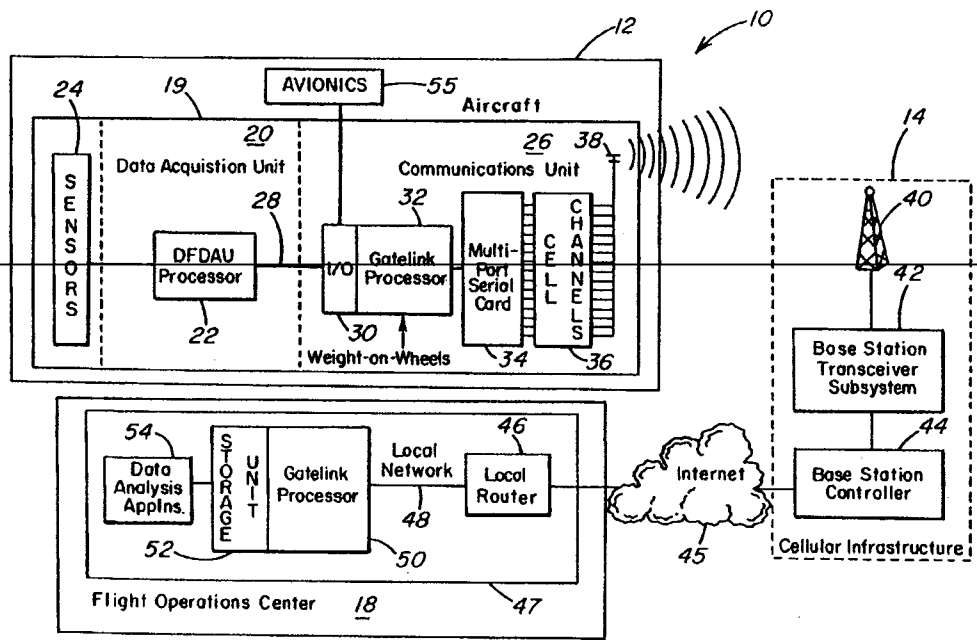


EXHIBIT A

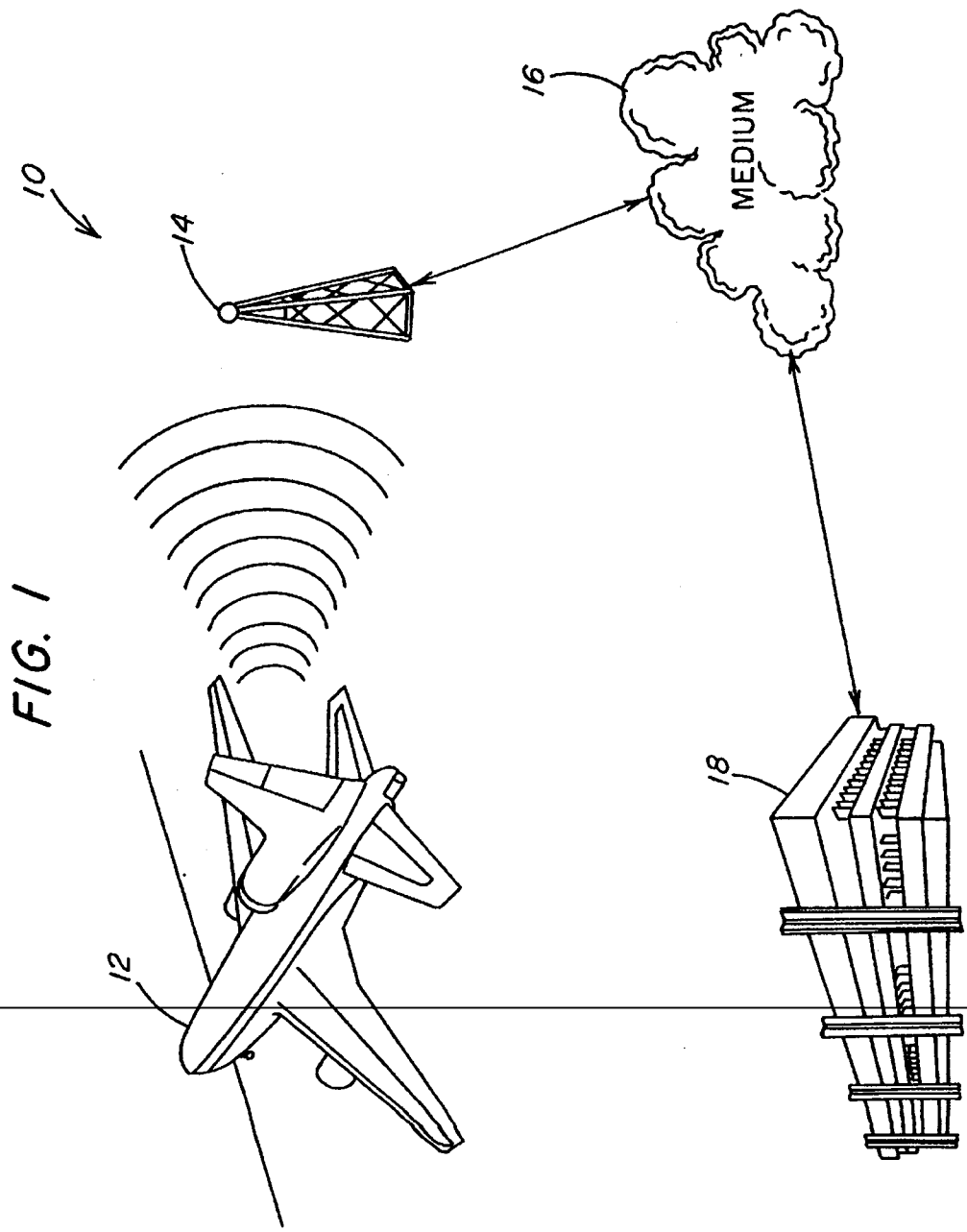
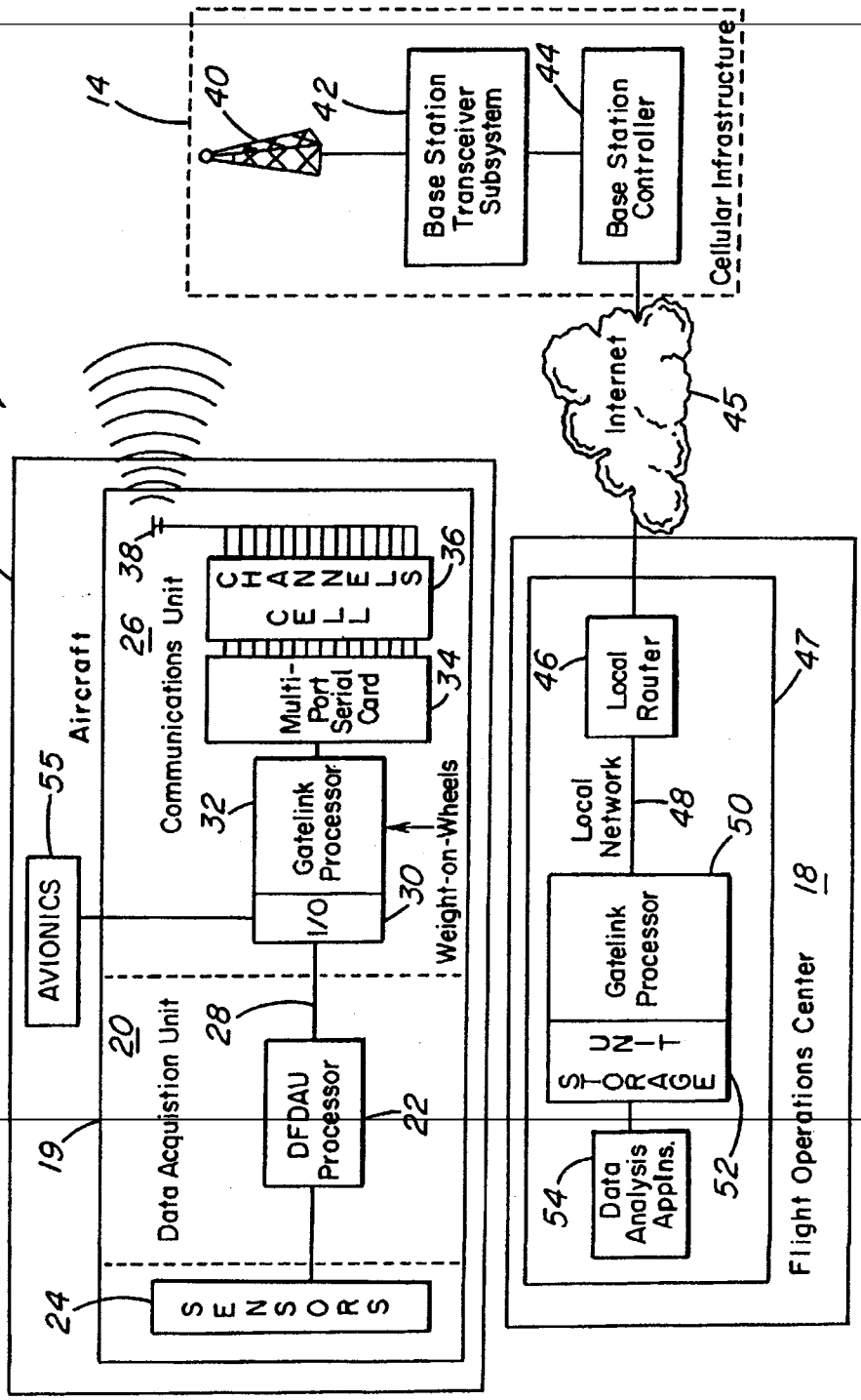


FIG. 1

FIG. 2



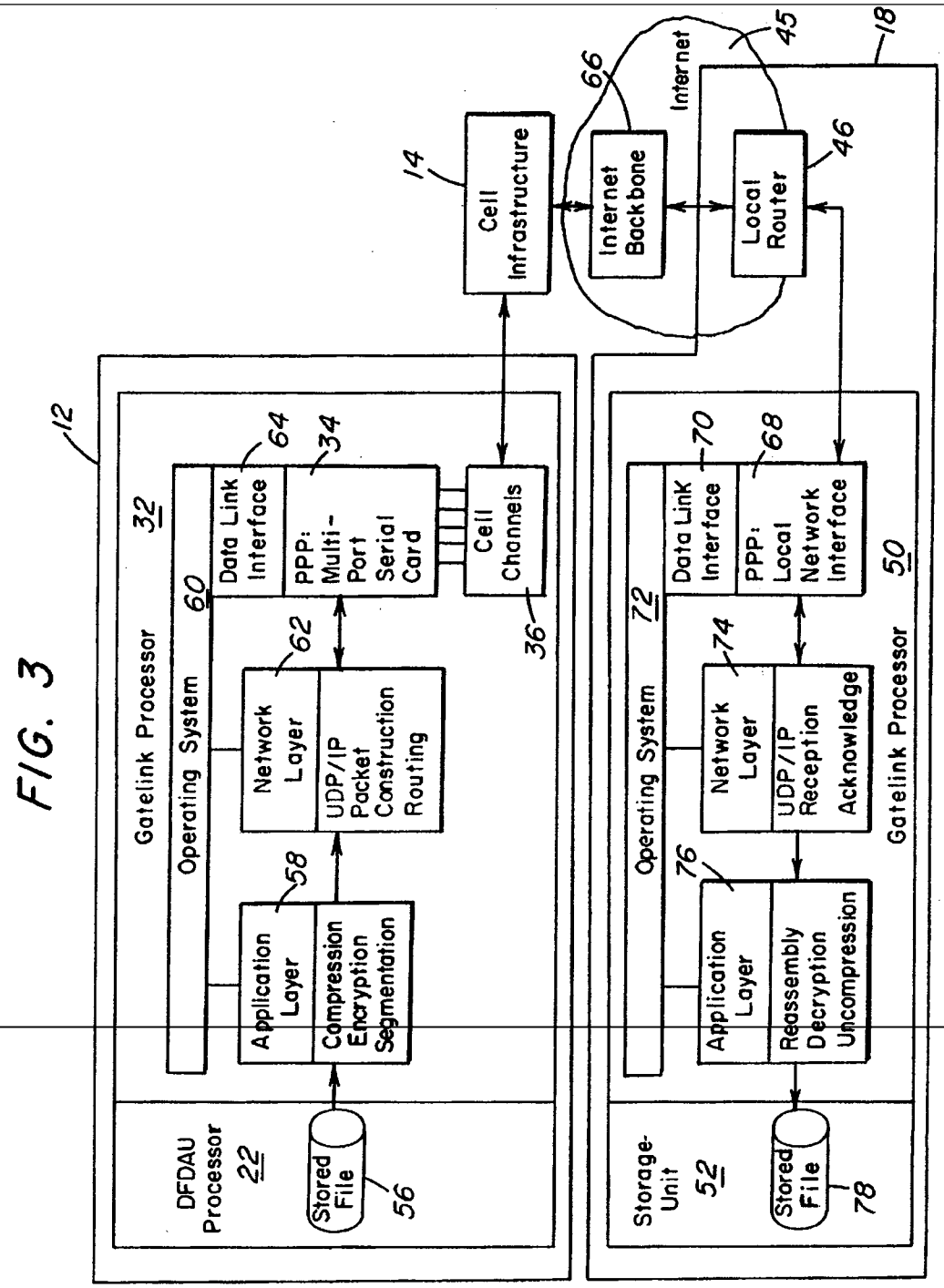


FIG. 3

FIG. 4

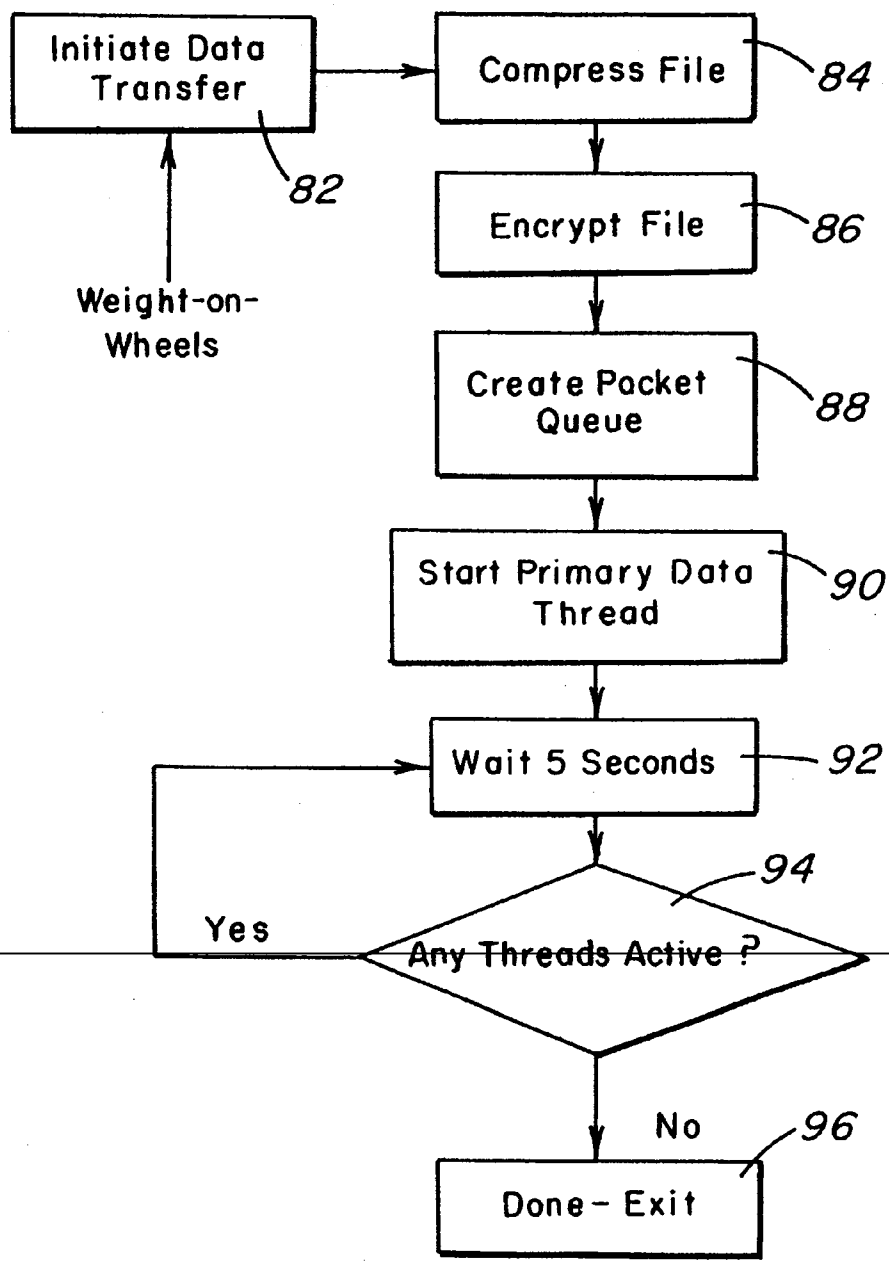


FIG. 5

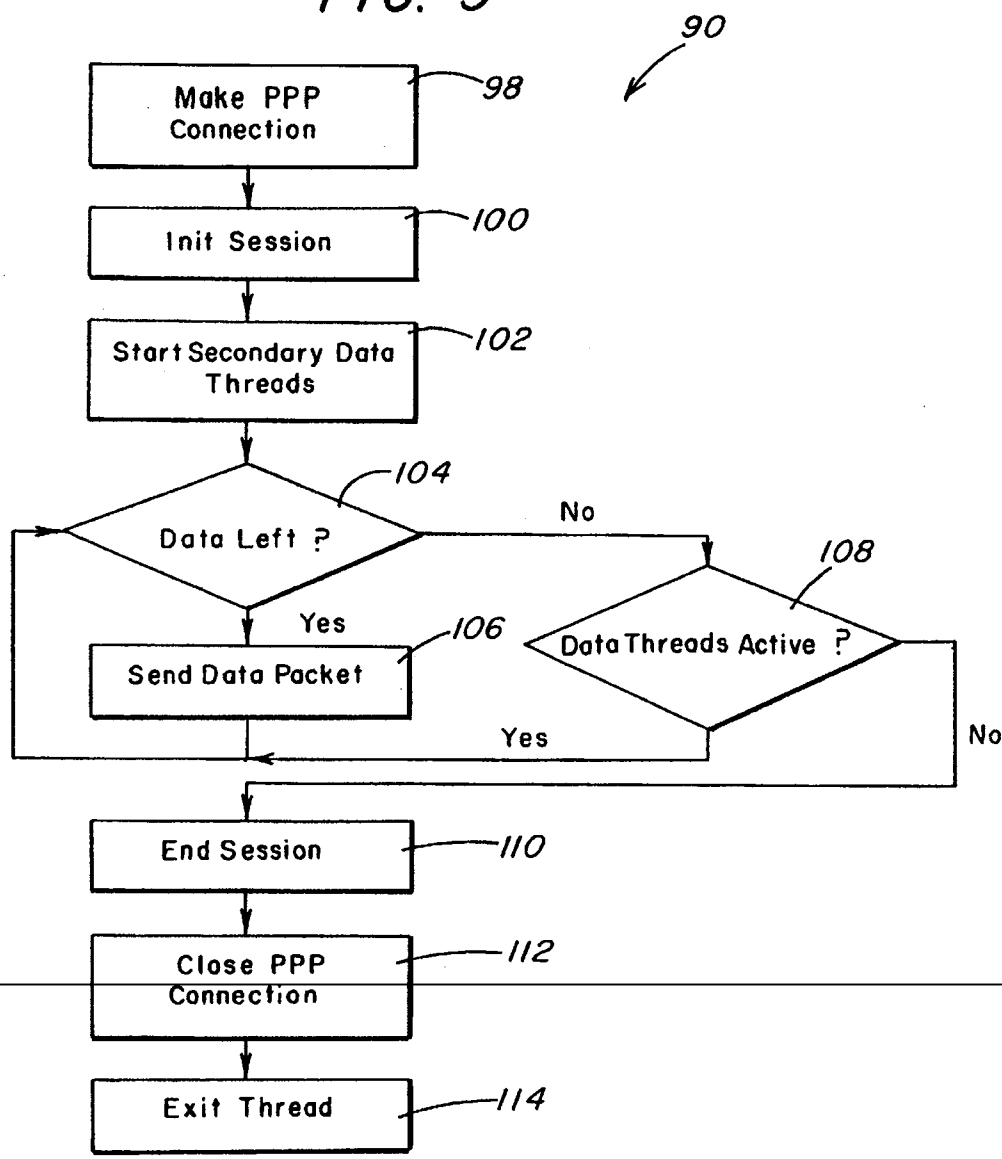


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FIG. 6

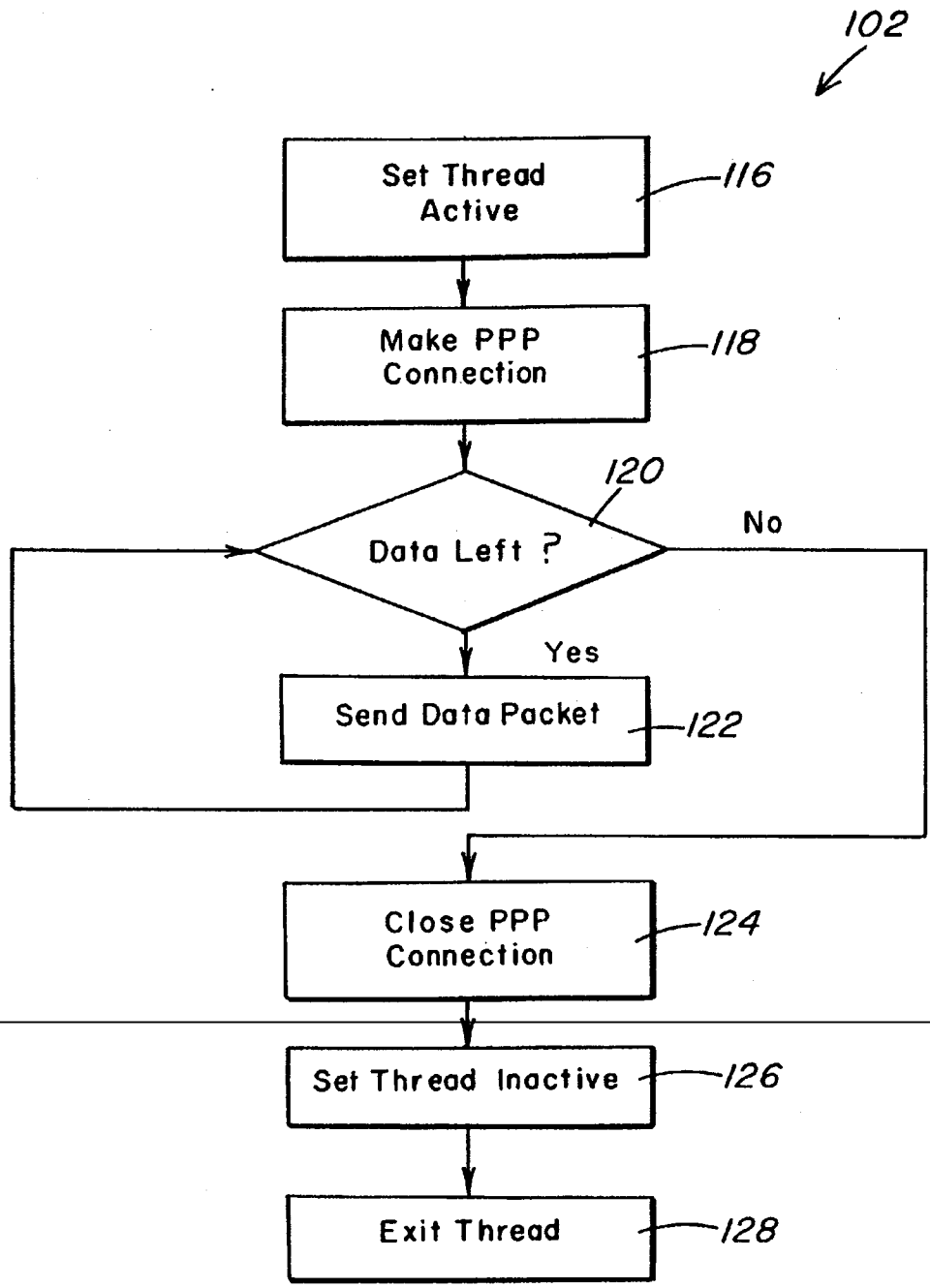

FIG. 7

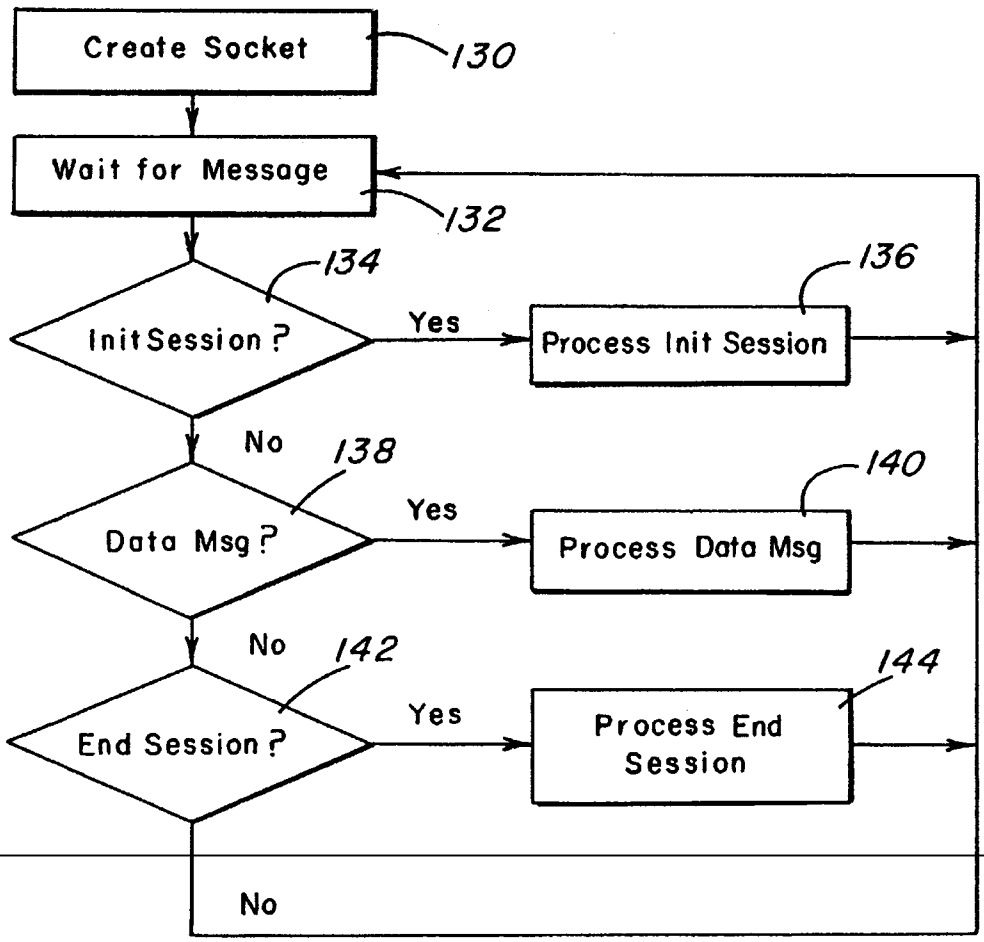

FIG. 8

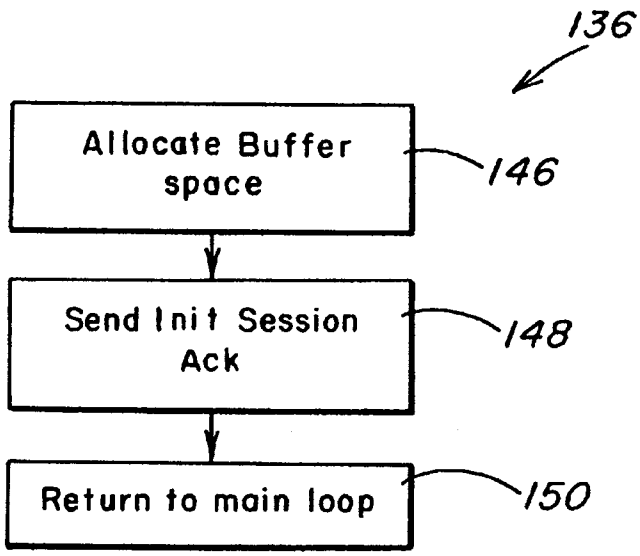

FIG. 9

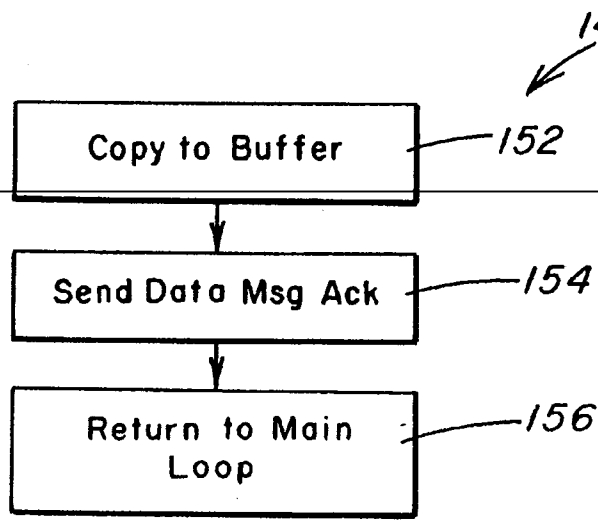

FIG. 10

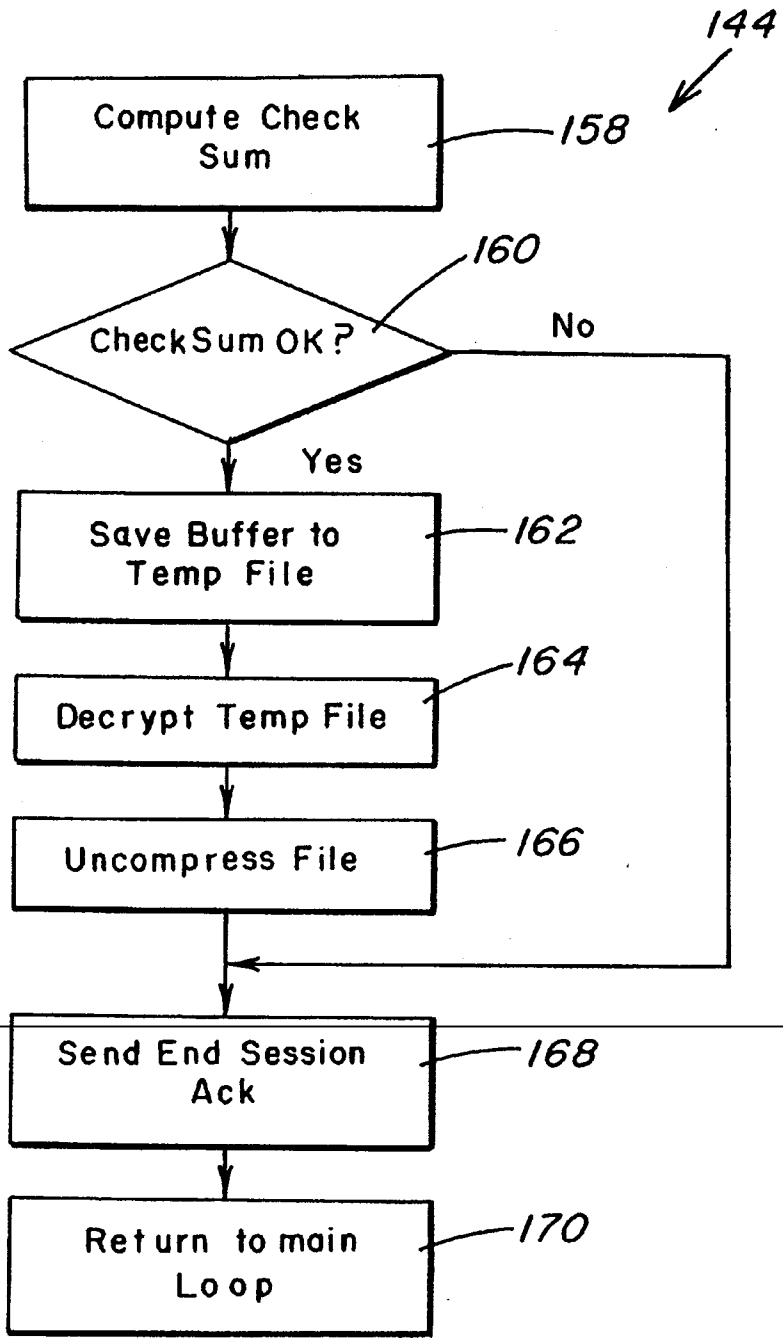

FIG. 11

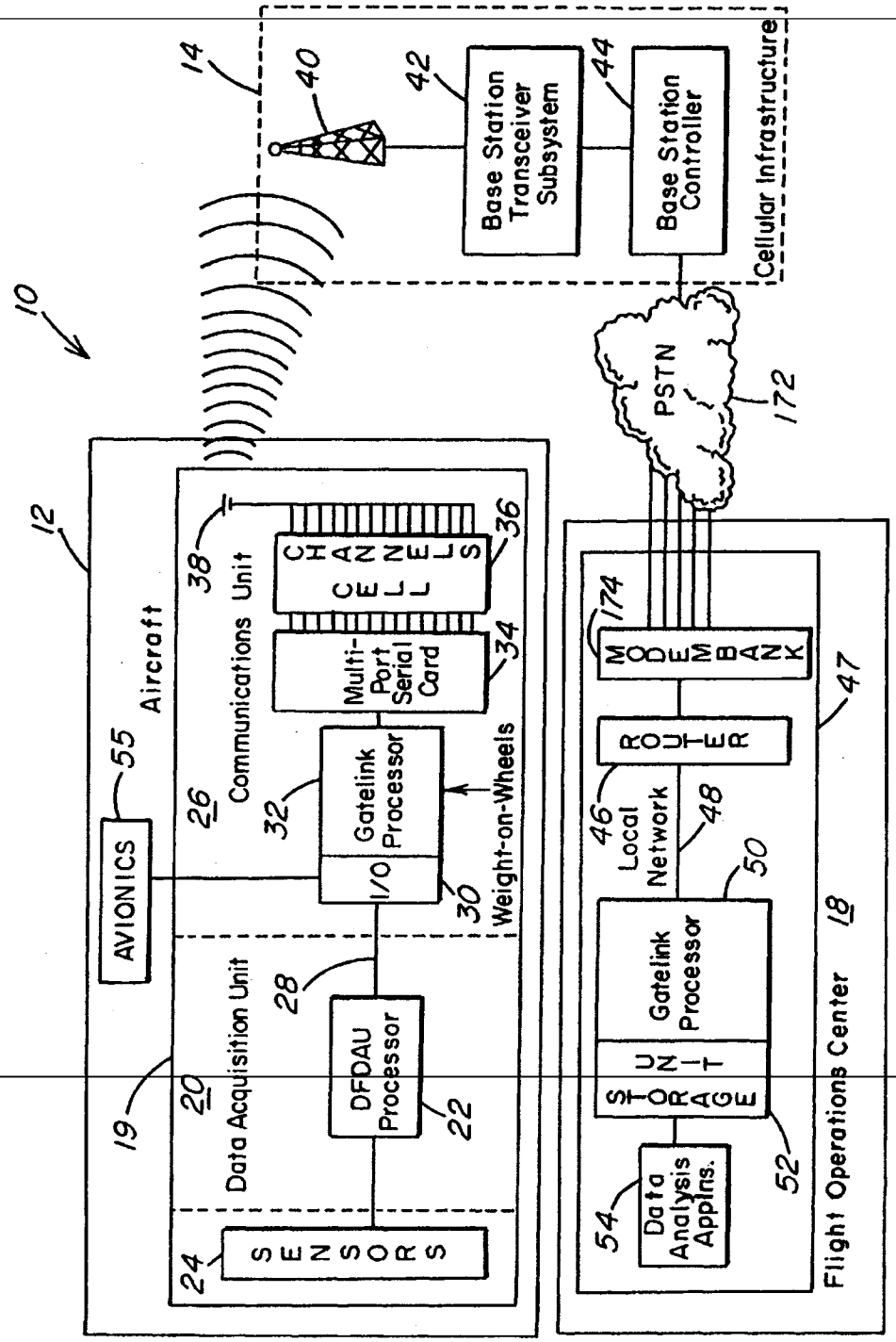

EXHIBIT A

AIRCRAFT FLIGHT DATA ACQUISITION AND TRANSMISSION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

(Not Applicable)

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

(Not Applicable)

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is directed generally to an aircraft flight data acquisition and transmission system and, more particularly, to an on-board cellular data transmission system.

2. Description of the Background

It is common for aircraft to generate records of data relating to flight and performance parameters for each flight of the aircraft. The data typically relate to parameters such as air speed, altitude, vertical acceleration, heading, time, etc. The data are utilized in the event of an accident or a near-accident and to assist in maintenance of the aircraft by detecting faulty components or gradual deterioration of a system or component, to assist in reviewing crew performance, and to assist in logistical planning activities such as scheduling and routing.

Aircraft data are typically gathered by a digital flight data acquisition unit (DFDAU). The DFDAU typically stores the data on magnetic or magnetic-optical media. When the aircraft lands, ground personnel board the aircraft, remove the media, and mail the media to a flight operations center (FOC). The manual removal and posting of the data adds a significant labor cost, yields less than desirable data delivery reliability, and results in a significant time delay before the data are useful for analysis.

It is known to use radio frequency (RF) transmissions to transmit data relating to an aircraft. Such teachings, however, require substantial investments to construct the RF transmission systems required for such a system to work. Furthermore, it is very expensive to create redundancy in such a system.

It is also known to transmit data relating to an aircraft via a telephone system located in a terminal. Such a system, however, requires that the aircraft be docked at the gate before transmission begins, thereby resulting in a substantial delay in the transmission. Furthermore, such a system requires an added step of transmitting the data from the aircraft to the terminal telephone system, increasing the cost of installing, operating, and maintaining such a system.

Thus, there is a need for an aircraft data transmission system that automatically transfers flight data from an aircraft to a flight operations center with little or no human involvement and which relies on a reliable wireless delivery system.

SUMMARY OF THE INVENTION

The present invention is directed to an aircraft data transmission system used with an aircraft having a data acquisition unit. The system includes a communications unit located in the aircraft and in communication with the data acquisition unit. The system also includes a cellular infrastructure in communication with the data communications unit after the aircraft has landed. The system further includes a data reception unit in communication with the cellular infrastructure.

The present invention represents a substantial advance over prior aircraft data acquisition and transmission systems. For example, the present invention has the advantage that it requires little expense to implement because it uses well-known technology and the cellular infrastructure which is already in place. The present invention also has the advantage that it can transmit data over multiple parallel channels to achieve the necessary transmission bandwidth and achieve a low data transmission time. The present invention has the further advantage that it does not require a dedicated data link between the aircraft and the flight operations center and/or an airport terminal.

BRIEF DESCRIPTION OF THE DRAWING

For the present invention to be clearly understood and readily practiced, the present invention will be described in conjunction with the following figures, wherein:

FIG. **1** illustrates an aircraft data acquisition and transmission system;

FIG. **2** is a block diagram illustrating a more detailed embodiment of the system illustrated in FIG. **1**;

FIG. **3** is a block diagram illustrating data flow through the system illustrated in FIG. **2**;

FIG. **4** is a flowchart illustrating a method carried out by the gatelink processor in the aircraft;

FIG. **5** is a flowchart illustrating a method of performing the start primary data thread step of FIG. **4**;

FIG. **6** is a flowchart illustrating a method of performing the start secondary data threads step of FIG. **5**;

FIG. **7** is a flowchart illustrating a method of operating the gatelink processor in the flight operations center;

FIG. **8** is a flowchart illustrating a method of performing the initialize session process step of FIG. **7**;

FIG. **9** is a flowchart illustrating a method of performing the data message process step of FIG. **7**;

FIG. **10** is a flowchart illustrating a method of performing the end session process step of FIG. **7**; and

FIG. **11** is a block diagram illustrating another embodiment of the system illustrated in FIG. **1**.

DETAILED DESCRIPTION OF THE INVENTION

It is to be understood that the figures and descriptions of the present invention have been simplified to illustrate elements that are relevant for a clear understanding of the present invention, while eliminating, for purposes of clarity, other elements found in a typical communications system. It can be recognized that other elements are desirable and/or required to implement a device incorporating the present invention. For example, the details of the cellular communications infrastructure, the Internet, and the public-switched telephone network are not disclosed. However, because such elements are well known in the art, and because they do not facilitate a better understanding of the present invention, a discussion of such elements is not provided herein.

FIG. **1** illustrates an aircraft data acquisition and transmission system **10**. An aircraft **12**, which has stored flight data, is illustrated after landing. The aircraft **12** transmits flight data as cellular communications signals to a cellular infrastructure **14**. The cellular infrastructure **14** acts as a

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communications channel to the communications medium **16**. A flight operations center **18** is connected to the medium **16** by any conventional connectivity medium such as, for example, a leased line. Once the cellular connections are made via the medium **16** data can flow bidirectionally from or to the aircraft.

FIG. **2** is a block diagram illustrating a more detailed embodiment of the system **10** illustrated in FIG. **1**. The aircraft **12** includes a data system **19** having a data acquisition unit **20**. The data acquisition unit **20** includes a digital flight data acquisition unit (DFDAU) processor **22**, which includes a storage media for storing flight data in a digital format. The DFDAU processor **22** receives signals from sensors **24** which sense parameters such as air speed, altitude, vertical acceleration, heading, time, etc. The flight data are transferred to a communications unit **26** via a bus **28**. The bus **28** is connected to an I/O interface **30** in the communications unit **26**. The I/O interface **30** can be a standard bus interface such as, for example, an ARINC **429** bus interface.

The I/O interface **30** is connected to a gatelink processor **32**. The processor **32** can be a general purpose processor such as a personal computer, a microprocessor such as an Intel Pentium® processor, or a special purpose processor such as an application specific integrated circuit (ASIC) designed to operate in the system **10**. The processor **32** is responsive to a weight-on-wheels signal, which acts as an interrupt signal to signal the processor **32** to initiate transmission or reception of the data when the aircraft **12** has landed. Upon receipt of the weight-on-wheels signal from the landing gear of the aircraft **12**, the processor **32** prepares the flight data for transmission and transmits the data to a multi-port serial card **34**. Each I/O port of the card **34** is attached to a cell channel which can open, sustain, and close a physical, over-the-air channel to the cellular infrastructure **14**. The cell channels **36** can transmit simultaneously and can thus transmit data in parallel. Each cell channel **36** is connected to an antenna matching network and a post amplifier (not shown). An antenna **38** is installed in the aircraft **12** so as to optimize free space radiation to the cellular infrastructure **14**.

The data are transmitted over a cellular airlink using the physical layer modulation of the cellular infrastructure **14**. The cellular infrastructure **14** includes an antenna **40**, which is within free-space radiating range of the aircraft **12**. The antenna **40** is connected to a base station transceiver subsystem **42**. The subsystem **42** is connected to a base station controller **44** which has a direct connection via a router (not shown) to the Internet **45**. The flight data are transmitted via the Internet **45** to the flight operations center **18**.

A local router **46** in a data reception unit **47** of the flight operations center **18** is connected to the Internet **45**, such as via a connection to the backbone of the Internet **45**. The router **46** connects a local area network **48** to the Internet **45**. The local area network can be of any type of network such as, for example, a token ring network, an ATM network, or an Ethernet network. A gatelink processor **50** is connected to the network **48** and receives the flight data for storage in an attached storage unit **52**. The storage unit **52** can be any type of unit capable of storing data such as, for example, a disk array or a tape drive. The storage unit **52** makes the flight data available to data analysis applications **54** which can analyze and/or report the flight data to a user.

Data transfer can also occur from the flight operations center **18** to the aircraft **12**. The data are transmitted via the Internet **45** and the cellular infrastructure **14** and received by the antenna **38**. The serial card **34** receives the data from the cell channels **36** and the processor **32** outputs the data, via the I/O interface **30**, to avionics **55**.

FIG. **3** is a block diagram illustrating data flow through the system **10** illustrated in FIG. **2**. The flight data is stored in the DFDAU processor **22** as a stored file **56**. An application layer **58** of an operating system **60** of the gatelink processor **32** compresses, encrypts, and segments the data. The operating system **60** can be any type of operating system suitable such as, for example, UNIX. A typical stored file may be compressed from approximately 40 Mbytes to approximately 4 Mbytes. Compression may be done by any compression method such as, for example, the method embodied in the PKZIP® compression utility, manufactured by PKWARE, Inc. Encryption can be accomplished using any suitable asymmetric (public key) or symmetric encryption method such as, for example, the method embodied in Data Encryption Software (DES), manufactured by American Software Engineering or the methods in the RC2, RC4, or RC5 encryption software manufactured by RSA Data Security, Inc. During segmentation individual datagrams of, for example, 1024 bytes are formed and indexed for subsequent reassembly.

The operating system **60** passes the datagrams to a network layer **62** which constructs UDP/IP packets from the datagrams by adding message headers to the datagrams. The network layer **62** then routes the packets to one of up to 16 peer-to-peer protocol (PPP) threads running within the operating system **60** at a data link layer interface **64**. The PPP threads convey the packets to the multi-port serial card **34** for transmission to the backbone **66** of the Internet **45** via the cell channels **36** to the cellular infrastructure **14**. The packets are received from the Internet **45** by the local router **46** in the flight operations center **18**. The network layer **62** receives acknowledgments of received packets from the gatelink processor **50** in the flight operations center **18**. The network layer **62** also re-queues packets that are dropped before reaching the gatelink processor **50**.

The local router **46** in the flight operations center **18** receives the packets and routes them to the gatelink processor **50**. A local network interface **68** receives the packets and a data link layer interface **70** of an operating system **72** passes the packets to a network layer **74** of the operating system **72**. The operating system **72** can be any type of suitable operating system such as, for example, UNIX. The network layer **74** sends acknowledgments of successful packet deliveries to the gatelink processor **32**. The network layer **74** also removes the UDP/IP headers and passes the datagrams to an application layer **76**. The application layer **76** reassembles, decrypts, and uncompresses the datagrams to restore the flight data to its original form. The application layer then passes the data to a stored file **78** in the storage unit **52**. The functions performed by the aircraft **12** and the flight operations center **18** are similarly interchangeable when data is transferred from the flight operations center **18** to the aircraft **12**.

FIG. **4** is a flowchart illustrating a method carried out by the gatelink processor **32** in the aircraft. At step **82**, the gatelink processor **32** receives a weight-on-wheels interrupt which signals that the aircraft has landed, and the data transfer is initiated. The application layer **58** compresses the flight data at step **84** and encrypts the data at step **86**. At step **88**, the data is segmented into datagrams and UDP/IP packets are constructed. The packets are then placed in a packet queue. The packets are then ready for transmission as a fixed number of threads, corresponding to the number of cell channels **36**. At step **90**, the primary data thread is

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started to make the initial call and open the communications channel to the flight operations center **18**. A wait state at step **92** is invoked for a predetermined period of time (5 sec.) and at step **94**, the processor **32** determines if any threads are active, i.e. if there are any packets that haven't been transmitted or have been transmitted and dropped. If there are no packets remaining, the method is completed at step **96**. If there are packets remaining, the method enters the wait state at step **92** and subsequently determines if any threads are active at step **94**.

FIG. **5** is a flowchart illustrating a method of performing the start primary data thread step **90** of FIG. **4**. At step **98**, the point-to-point protocol (PPP) connection is initiated for the primary data thread through one of the cell channels **36** and the gatelink session is initiated at step **100**. The secondary data thread transmissions are started at step **102**. At step **104**, it is determined if any packets are left in the primary data thread to be transmitted. If so, the next packet in the primary data thread is transmitted at step **106**. If no packets are left to transmit in the primary data thread as determined at step **104**, it is determined if any of the secondary data threads are active at step **108**. If so, the process returns to step **104** and repeats step **108** until no threads are active. If no threads are active, the gatelink session is ended at step **110** and the PPP connection for the primary data thread is closed at step **112**. At step **114**, the primary data thread step **90** is completed.

FIG. **6** is a flowchart illustrating a method of performing the start secondary data threads step **102** of FIG. **5**. The method is carried out in parallel for each secondary data thread. At step **116**, the thread is set to active so that the processor **32** can determine if any threads are active at step **108** of FIG. **5**. The PPP connection for the secondary data thread being transmitted is initiated at step **118**. At step **120**, it is determined if any packets remain in the data thread. If so, the packet is transmitted at step **122**. If no packets remain in the data thread, the PPP connection is closed at step **124** and the thread is set to inactive at step **126**. The method is completed at step **128**.

FIG. **7** is a flowchart illustrating a method of operating the gatelink processor **50** in the flight operations center **18**. At step **130**, a socket is opened to allow the operating system **72** in the processor **50** to receive and transport messages across the Internet **45**. At step **132**, the processor **50** waits for a message from the Internet **16**. When a message is received, the processor **50** determines if the message is a session initialization message at step **134**. If the message is a session initialization message, the processor **50** executes the session initialization process at step **136**. If the message is not a session initialization message at step **134**, the processor **50** determines if the message is a data message at step **138**. If the message is a data message, the processor **50** executes the data message process at step **140**. If the message is not a data message, the processor **50** determines if the message is an end session message at step **142**. If the message is an end session message, the processor **50** executes the end session process at step **144** and then returns to step **132** to wait for additional messages..

FIG. **8** is a flowchart illustrating a method of performing the initialize session process step **136** of FIG. **7**. The processor **50** allocates buffer space for subsequent data reception at step **146**. The processor **50** then sends a session initialized data acknowledgment to the processor **32** at step **148**. At step **150**, the flow returns to step **132** of FIG. **7**.

FIG. **9** is a flowchart illustrating a method of performing the data message process step **140** of FIG. **7**. At step **152**, the received data message is copied to a buffer and an acknowledgment of the data received is sent at step **154**. At step **156**, the flow returns to step **132** of FIG. **7**.

FIG. **10** is a flowchart illustrating the steps included in the end session process step **144** of FIG. **7**. At step **158**, the checksum is computed for the received data to check the integrity of the data. The checksum is checked at step **160** and, if it is correct, the processor **50** saves the buffer to a temporary file at step **162**. The processor **50** then decrypts the file at step **164** and uncompresses the file at step **166**. The processor **50** sends an end session acknowledge message to the processor **32** at step **168** and at step **170**, the flow returns to step **132** of FIG. **7**. If the checksum is not correct, the processor **50** sends an unsuccessful end session message, which notifies the processor **32** to resend the data.

FIG. **11** is a block diagram illustrating another embodiment of the system **10** illustrated in FIG. **1**. The operation of the system **10** of FIG. **11** is similar to that described in conjunction with the system **10** of FIG. **2**. However, the flight data is transmitted from the cellular infrastructure **14** to the flight operations center **18** via the public-switched telephone network **172**. A modem bank **174** receives the data via the PSTN **172**. The data is then routed by the router **46** to the processor **50** via the network **48**. The modem bank **174** can have a modem dedicated to receive data transmitted by one of the cell channels **36**.

While the present invention has been described in conjunction with preferred embodiments thereof, many modifications and variations will be apparent to those of ordinary skill in the art. For example, although the system has been described hereinabove as transferring data from the aircraft, the system can also be used to transfer data to the aircraft with no modifications in the system. Also, the system may be used to transmit data while the aircraft is in flight. Furthermore, the system may be used without encryption and without data compression prior to sending data. The foregoing description and the following claims are intended to cover all such modifications and variations.

What is claimed is:

1. An aircraft data transmission system, the aircraft having a data acquisition unit, comprising:

a communications unit located in the aircraft and in communication with the data acquisition unit;

a cellular infrastructure in communication with said communications unit after the aircraft has landed, wherein the communication is initiated automatically upon landing of the aircraft; and

a data reception unit in communication with said cellular infrastructure.

2. The system of claim **1** wherein said data reception unit is in communication with said cellular infrastructure via the Internet.

3. The system of claim **1** wherein said data reception unit is in communication with said cellular infrastructure via the public switch telephone network.

4. The system of claim **1** wherein said communications unit has at least one modem in communication with said cellular infrastructure and said data reception unit has at least one modem in communication with said cellular infrastructure.

5. The system of claim **1** wherein said communications unit includes:

a processor;

a serial card in communication with said processor;

at least one cell channel in communication with said serial card; and

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at least one antenna in communication with said cell channel.

6. The system of claim 1 wherein said cellular infrastructure includes:

an antenna;

a transceiver subsystem in communication with said antenna; and

a controller in communication with said transceiver subsystem.

7. The system of claim 1 wherein said data reception unit includes:

a router; and

a processor in communication with said router, said processor having a storage unit.

8. A data system for an aircraft, comprising:

a digital flight data acquisition unit in communication with at least one sensor;

a processor in communication with said digital flight data acquisition unit;

a serial card in communication with said processor; and

a plurality of cell channels in communication with said serial card, said cell channels for transmitting data via a cellular infrastructure after the aircraft has landed, wherein the communication between the cell channels and the serial card is initiated automatically upon landing of the aircraft.

9. The system of claim 8 further comprising an antenna in communication with said cell channels.

10. The system of claim 8 wherein said processor includes a personal computer.

11. The system of claim 8 wherein said processor includes an ASIC.

12. The system of claim 8 wherein said processor includes a microprocessor.

13. The system of claim 8 wherein said processor has an I/O interface in communication with said digital flight data acquisition unit.

14. An aircraft, comprising:

a digital flight data acquisition unit in communication with at least one sensor; and

a communications unit in communication with said digital flight data acquisition unit, said communications unit including:

a processor in communication with said digital flight data acquisition unit;

a serial card in communication with said processor; and

a plurality of cell channels in communication with said ~~serial card, said cell channels for transmitting data~~ via a cellular infrastructure after the aircraft has landed, wherein the communication between the cell channels and the serial card is initiated automatically upon landing of the aircraft.

15. An aircraft data transmission system, the aircraft having a data acquisition unit, comprising:

means for transmitting data from the data acquisition unit via a cellular infrastructure after the aircraft has landed, wherein transmission of the data is initiated automatically upon landing of the aircraft; and

means for receiving said data from said cellular infrastructure.

16. The system of claim 15 wherein said means for transmitting data includes a processor.

17. The system of claim 15 wherein said means for receiving data includes a processor.

18. A method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a data acquisition unit;

transmitting said flight data via a cellular communications infrastructure after the aircraft has landed, wherein the cellular communications infrastructure is accessed automatically upon landing of the aircraft; and

receiving said transmitted flight data.

19. A computer-implemented method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a digital flight data acquisition unit;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastructure after the aircraft has landed, wherein the cellular infrastructure is accessed automatically upon landing of the aircraft.

20. The method of claim 19 further comprising receiving said transmitted data at a flight operations center.

21. The method of claim 20 further comprising receiving said transmitted data and transmitting said received data via the Internet before receiving said transmitted data at a flight operations center.

22. The method of claim 20 further comprising receiving said transmitted data and transmitting said received data via the public-switched telephone network before receiving said transmitted data at a flight operations center.

23. The method of claim 19 wherein processing said flight data includes:

compressing said flight data;

encrypting said flight data;

segmenting said flight data; and

constructing packets of data from said segmented flight data.

24. The method of claim 19 wherein receiving said transmitted data includes:

acknowledging receipt of said transmitted data;

reassembling said received data;

decrypting said reassembled data;

uncompressing said decrypted data; and

storing said uncompressed data.

25. A computer-implemented method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a digital flight data acquisition unit;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastructure after the aircraft has landed, wherein processing said flight data includes:

receiving a weight-on-wheels signal;

initiating a data transfer;

compressing said flight data;

encrypting said compressed data;

creating a packet queue;

starting a primary data thread;

waiting a predetermined period of time;

determining if any threads are active;

repeating, when threads are active, the steps of waiting a predetermined period of time and determining if any threads are active; and

exiting processing said flight data when no threads are active.

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26. The method of claim 25 wherein starting a primary data thread includes:

initiating a PPP connection;

initiating a transfer session;

~~starting at least one secondary data thread;~~

determining if data remains in the primary data thread;

sending said data when data remains in the primary data thread;

determining if data threads are active when no data remains in the primary data thread;

repeating, when said threads are active, the step of determining if data remains in the primary data thread;

ending said session when no threads are active;

closing said PPP connection; and

exiting starting a primary data thread.

27. The method of claim 26 wherein starting at least one secondary data thread includes:

(a) setting the secondary data thread to active;

(b) initiating a PPP connection;

(c) determining if data remains in the secondary data thread;

(d) sending a data packet when data remains;

(e) repeating step c when data remains;

(f) closing said PPP connection when no data remains;

(g) setting the secondary data thread to inactive;

(h) exiting starting at least one secondary data thread; and

(i) repeating steps a through h for each secondary data thread.

28. The method of claim 27 wherein repeating steps a through h includes repeating steps a through h in parallel for each said secondary data thread.

29. A computer-implemented method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a digital flight data acquisition unit;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastructure after the aircraft has landed; and

receiving said transmitted data at a flight operations center, wherein receiving said transmitted data includes:

creating a socket;

receiving a message;

determining if said message is an initialization message;

initiating a session when said message is an initialization message;

determining if said message is a data message when said message is not an initialization message;

processing said message when said message is a data message;

determining if said message is an end session when said message is not a data message;

processing said message when said message is an end session; and

repeating, when said message is not an end session message, the step of receiving a message.

30. The method of claim 29 wherein initializing a session includes:

allocating buffer space;

sending an initiation session acknowledgment; and

returning to receiving a message.

31. The method of claim 29 wherein processing said message when said message is a data message includes:

copying said message to a buffer;

sending a data message acknowledgment; and

returning to receiving a message.

32. The method of claim 29 wherein processing said message when said message is not an end session includes:

computing a checksum;

determining if said checksum is valid;

saving a buffer to a temporary file;

decrypting said temporary file;

uncompressing said temporary file;

sending an end session acknowledgment; and

returning to receiving a message.

33. A computer readable medium having stored thereon instructions which when executed by a processor, cause the processor to perform the steps of:

receiving flight data from a digital flight data acquisition unit in an aircraft;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastructure when said aircraft has landed, wherein the cellular infrastructure is accessed automatically upon landing of the aircraft.

* * * * *

EXHIBIT A

US 6,181,990C1

(12) EX PARTE REEXAMINATION CERTIFICATE (5393rd)

United States Patent

Grabowsky et al.

(10) Number: US 6,181,990 C1

(45) Certificate Issued: Jun. 6, 2006

(54) **AIRCRAFT FLIGHT DATA ACQUISITION AND TRANSMISSION SYSTEM**

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(73) Assignee: **Teledyne Technologies Incorporated**, Los Angeles, CA (US)

Reexamination Request:
No. 90/006,742, Aug. 12, 2003

Reexamination Certificate for:

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(51) **Int. Cl.**

H04B 7/00	(2006.01)
G06F 13/00	(2006.01)

(52) **U.S. Cl.** ..... **701/14**; 701/35; 701/16; 455/431; 342/33; 73/178 T

(58) **Field of Classification Search** ..... 701/3, 701/14, 16; 340/945, 947, 948, 951, 960; 73/178 T; 342/33

See application file for complete search history.

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Primary Examiner—Y. Beaulieu

(57) **ABSTRACT**

An aircraft data transmission system used with an aircraft having a data acquisition unit. The system includes a communications unit located in the aircraft and in communication with the data acquisition unit. The system also includes a cellular infrastructure in communication with the data communications unit after the aircraft has landed. The system further includes a data reception unit in communication with the cellular infrastructure.

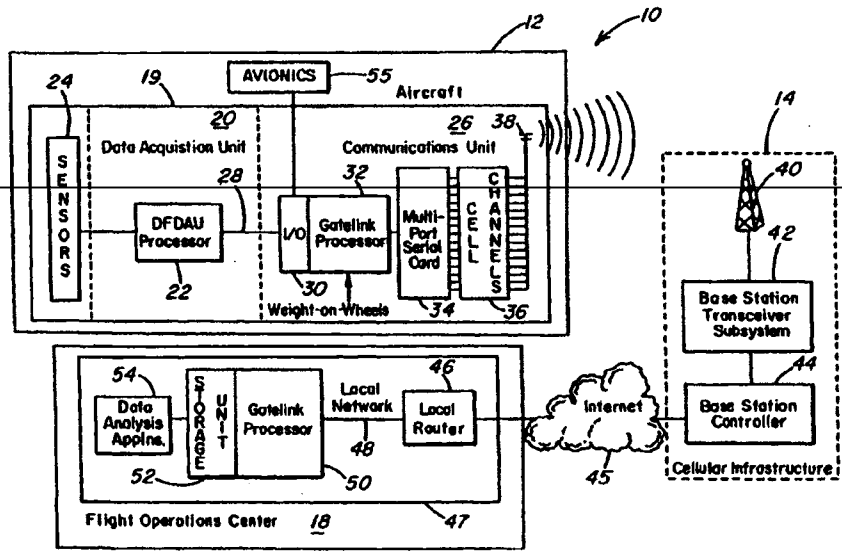

EXHIBIT A

EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **8–14** and **25–32** is confirmed.

Claims **1, 15, 18, 19** and **33** are determined to be patentable as amended.

Claims **2–7, 16, 17** and **20–24**, dependent on an amended claim, are determined to be patentable.

New claims **34–51** are added and determined to be patentable.

1. An aircraft data transmission system, the aircraft having a data acquisition unit, *and the aircraft including a data storage medium having stored thereon flight data gathered in-flight by at least a first sensor on the aircraft,* comprising:

a communications unit located in the aircraft and in communication with the data acquisition unit;

at least a second sensor configured to sense a landing of the aircraft;

a cellular infrastructure in communication with said communications unit after the aircraft has landed, *wherein the cellular infrastructure communicates said flight data, and* wherein the communication is initiated [automatically upon] *when at least the second sensor senses the* landing of the aircraft; [and]

a data reception unit in communication with said cellular infrastructure; *and*

wherein said flight data includes time, airspeed, altitude, vertical acceleration, and heading data relating to a flight of the aircraft.

15. An aircraft data transmission system, the aircraft having a data acquisition unit, *the aircraft including a data storage medium having stored thereon flight data gathered in-flight by at least one sensor on the aircraft,* comprising:

sensing means for sensing a landing of the aircraft;

means for transmitting *said flight* data from the data acquisition unit, via a cellular infrastructure after the aircraft has landed, wherein transmission of the data is initiated [automatically upon] *when the sensing means sense the* landing of the aircraft; [and]

means for receiving said *flight* data from said cellular infrastructure; *and*

wherein said flight data includes time, airspeed, altitude, vertical acceleration, and heading data relating to a flight of the aircraft.

18. A method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a data acquisition unit;

receiving a signal indicating a landing of the aircraft from at least a first sensor;

transmitting said flight data via a cellular communications infrastructure after the aircraft has landed, wherein the cellular communications infrastructure is accessed [automatically upon landing of the aircraft] *in response to the signal*; [and]

receiving said transmitted flight data; *and*

wherein said flight data is gathered in-flight by at least a second sensor on the aircraft, and includes time, airspeed, altitude, vertical acceleration, and heading data relating to a flight of the aircraft.

19. A computer-implemented method of transmitting aircraft flight data from an aircraft, comprising:

receiving flight data from a digital flight data acquisition unit, *wherein said flight data is gathered in-flight by at least a first sensor on the aircraft, and includes time, airspeed, altitude, vertical acceleration, and heading data relating to a flight of the aircraft*;

receiving a signal indicating a landing of the aircraft from at least a second sensor;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastructure after the aircraft has landed, wherein the cellular infrastructure is accessed [automatically upon landing of the aircraft] *in response to the signal.*

33. A computer readable medium having stored thereon instructions which when executed by a processor, cause the processor to perform the steps of:

receiving flight data from a digital flight data acquisition unit in an aircraft, *wherein said flight data is gathered in-flight by at least a first sensor on the aircraft, and includes time, airspeed, altitude, vertical acceleration, and heading data relating to a flight of the aircraft;*

receiving a signal indicating a landing of the aircraft from at least a second sensor;

processing said flight data to prepare said data for transmission; and

transmitting said processed data via a cellular infrastracture when said aircraft has landed, wherein the cellular infrastructure is accessed [automatically upon landing of the aircraft] *in response to the signal.*

34. The system of claim 1, wherein the cellular infrastructure is a cellular telephone infrastructure.

35. The system of claim 34, wherein said data reception unit is in communication with said cellular infrastructure via the Internet.

36. The system of claim 34, wherein said data reception unit is in communication with said cellular infrastructure via the public switch telephone network.

37. The system of claim 34, wherein said data communications unit has at least one modem in communication with said cellular infrastructure and said data reception unit has at least one modem in communication with said cellular infrastructure.

38. The system of claim 34, wherein said communications unit includes:

a processor;

a serial card in communication with said processor;

at least one cell channel in communication with said serial card; and

at least one antenna in communication with said cell channel.

39. The system of claim 34, wherein said cellular infrastructure includes:

an antenna;

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a transceiver subsystem in communication with said antenna; and

a controller in communication with said transceiver subsystem.

40. The system of claim 34, wherein said data reception unit includes:

a router; and

a processor in communication with said router, said processor having a storage unit.

41. The system of claim 15, wherein the cellular infrastructure is a cellular telephone infrastructure.

42. The system of claim 41, wherein said means for transmitting data includes a processor.

43. The system of claim 41, wherein said means for receiving data includes a processor.

44. The method of claim 18, wherein the cellular communications infrastructure is a cellular telephone infrastructure.

45. The method of claim 19, wherein the cellular infrastructure is a cellular telephone infrastructure.

46. The method of claim 45 further comprising receiving said transmitted data at a flight operations center.

47. The method of claim 46 further comprising receiving said transmitted data and transmitting said received data via

the Internet before receiving said transmitted data at a flight operations center.

48. The method of claim 46 further comprising receiving said transmitted data and transmitting said received data via the public-switched telephone network before receiving said transmitted data at a flight operations center.

49. The method of claim 45 wherein processing said flight data includes:

compressing said flight data;

encrypting said flight data;

segmenting said flight data; and

constructing packets of data from said segmented flight data.

50. The method of claim 45 wherein receiving said transmitted data includes:

acknowledging receipt of said transmitted data;

reassembling said received data;

decrypting said reassembled data;

uncompressing said decrypted data; and

storing said uncompressed data.

51. The method of claim 33, wherein the cellular infrastructure is a cellular telephone infrastructure.

* * * * *

EXHIBIT A

CONFIDENTIAL DISCLOSURE AGREEMENT

THIS AGREEMENT is made by and between Teledyne Controls, having a principal office at 12333 West Olympic Boulevard Los Angeles, California 90064 U.S.A. (hereinafter "COMPANY"), and Honeywell International Inc., a Delaware corporation acting through Honeywell Engines, Systems and Services, having a principal place of business at 111 South 34th Street, Phoenix, Arizona 85034 ("HONEYWELL").

WHEREAS, COMPANY is a manufacturer of Wireless Ground Link and possesses certain information, data, and experience relating thereto (hereinafter "INFORMATION" as applied to COMPANY) which it considers to be confidential, proprietary, and a valuable commercial asset of COMPANY;

WHEREAS, HONEYWELL represents that it possesses certain experience relating to Business Aviation Aircraft powered by Honeywell TFE731 and AS900 engines (hereinafter "INFORMATION" as applied to HONEYWELL) which it considers to be confidential, proprietary, and a valuable commercial asset of HONEYWELL; and

WHEREAS, COMPANY and HONEYWELL (hereinafter "PARTIES"), desire to facilitate discussion between the PARTIES, COMPANY is willing to disclose its INFORMATION to HONEYWELL, to the extent COMPANY considers reasonably necessary, and HONEYWELL is willing to disclose its INFORMATION to COMPANY, to the extent HONEYWELL considers reasonably necessary, to enable the PARTIES to technically evaluate the other's INFORMATION for the purpose of discussing possible application of the Wireless Ground Link product to transmit engine data for processing and of furthering the business relationship between the PARTIES, and both COMPANY and HONEYWELL are willing to receive respective INFORMATION subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the undertakings hereunder, both PARTIES, intending to be legally bound, hereby agree as follows:

1. It is understood and agreed that each PARTY shall treat all INFORMATION hereafter received or acquired, directly or indirectly, from the other as confidential and with the same degree of care with which it treats and protects its own proprietary information of similar character to prevent disclosure. Honeywell Engines, System and Services, located at 111 South 34th Street, Phoenix, Arizona 85034, shall not disclose INFORMATION to other than its officers and employees who need to receive such INFORMATION for purposes of discussion, and who are informed of the obligations of this Agreement. Teledyne Controls, located at 12333 West Olympic Boulevard, Los Angeles, California 90064, shall not disclose INFORMATION to other than its officers and employees who need to receive such INFORMATION for purposes of discussion, and who are informed of the obligations of this Agreement. The receiving PARTY shall not use any of the INFORMATION of the other except as contemplated by this Agreement. Such INFORMATION directly disclosed to the other may be supplied orally, visually, or in written or other tangible form and may include drawings and specifications. Such INFORMATION shall be either in tangible form

marked as confidential at the time of disclosure or later identified in writing as confidential within thirty (30) days thereafter.

Information shall be considered as Confidential Information by the Recipient only if such information is conspicuously designated as "Confidential", "Proprietary", or a similar legend. Information disclosed orally shall be considered Proprietary Information if it is (a) identified as confidential, proprietary, or the like at the time of disclosure, and (b) confirmed in writing within thirty (30) days of first disclosure.

Each PARTY will designate in writing one or more individuals within their own organizations as the only person(s) authorized to receive INFORMATION pursuant to this Agreement. Such persons are:

COMPANY	HONEYWELL
Tamas Igloi	Carl Kotlarz

Each PARTY may change its designation by written notice to the other. However, all properly marked INFORMATION shall be protected as required by this Agreement even if not furnished to the designated points of contact listed above.

2. It shall be understood that the obligations of Paragraph 1 shall not apply to information which either COMPANY or HONEYWELL can establish:

(a) by documented records is known to the receiving PARTY prior to receipt from the other; or

(b) is or becomes available to the public generally other than by or through acts or omissions in breach of this Agreement by the receiving PARTY; or

(c) is rightfully obtained by the receiving PARTY without restriction from sources, other than the disclosing PARTY, who are rightfully in possession of such information, and who are not known to be under any obligation of confidentiality to the disclosing PARTY; or

(d) was disclosed with the COMPANY'S written consent, or, was disclosed to HONEYWELL by the COMPANY without any identification that it was confidential or proprietary.

(e) is independently developed by or for one PARTY without recourse to any INFORMATION of the disclosing PARTY.

For purposes of Paragraph 2, it is understood and agreed that specific technical information which the receiving PARTY may obtain hereunder shall not be free of such obligations merely because individual features or parts of the INFORMATION are embraced within the scope of

more general information known to that PARTY, available to the public generally, obtained from other sources, or independently developed.

3. Both PARTIES agree that all tangible embodiments of INFORMATION made or obtained by the receiving PARTY shall be and remain the property of the disclosing PARTY, may not be reproduced by the receiving PARTY without written consent of the other, and shall be returned to the disclosing PARTY promptly upon written request made by the disclosing PARTY.

4. Except as provided herein, it is understood and agreed that no right or license is granted or implied by this Agreement to a PARTY under any patents or patent applications, proprietary information or other intellectual property right owned or controlled by the other PARTY.

5. INFORMATION may be disclosed to each PARTY under this Agreement for a period of one (1) year from the date last signed below, unless earlier terminated by either PARTY upon thirty (30) days' prior written notice to the other. Both PARTIES' obligations of confidentiality, nondisclosure, and nonuse shall terminate at the expiration of three (3) years from the last date of disclosure hereunder.

6. Both PARTIES will adhere to all U.S. applicable laws, regulations and rules relating to the export of technical data and products and shall not export or re-export any technical data, any products received from the other, or the direct product of such technical data to any proscribed country listed in such applicable laws, regulations and rules, unless properly authorized.

7. This Agreement is under the laws of the State of California, USA. It may not be amended or modified except in writing signed by both PARTIES. It is the entire agreement between the parties regarding the subject matter hereof and supersedes any prior agreement, understanding, or discussion on said subject matter. A waiver of, or failure to enforce any provision or right hereunder shall not be effective or charged against a party unless in writing and signed by the waiving party; shall not be deemed a waiver of any other or subsequent breach of this Agreement; and shall not prevent subsequent enforcement of the provision or right.

Honeywell Engines, Systems and Services	TELEDYNE CONTROLS
By:	By:
Typed Name:	Typed Name: David A. Frieden
Title:	Title: Director of Contracts & Pricing
Date: 22 November 2002	Date: 21 November 2002